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EXAMINER

STAICOVICI, STEFAN

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1732

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/000,148

Applicant(s)

MAXWELL ET AL.

Examiner

Stefan Staicovici

Art Unit

1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 7-10, 12-46, 50 and 52-103 is/are pending in the application.
- 4a) Of the above claim(s) 22-44 and 67-100 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-10, 12-21, 45-46, 50, 52-66, 101-103 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicants' amendment filed January 4, 2005 has been entered. Claims 1, 16-17, 45, 59-61 and 63 have been amended. Claims 4-6, 11, 47-49 and 51 have been canceled. New claims 101-103 have been added.

Claims 1-3, 7-10, 12-46, 50 and 52-103 are pending in the instant application.

Specification

2. The abstract of the disclosure is objected to because THE abstract should avoid using phrases that can be implied, such as, "disclosed". Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 101-102 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claim 101, the limitation of "altering the shape of the first tool such that the interior surface of the first tool *aligns* with the exterior surface of the second tool" (emphasis added) does

not appear to have support in the original disclosure. Although the original disclosure appears to have support for the proposition that the first tool shrinks during cooling due to a different thermal contraction coefficient than the molding materials and the second tool, the original disclosure does not appear to have support for "altering the shape of the first tool such that the interior surface of the first tool *aligns* with the exterior surface of the second tool." Claim 102 is rejected as a dependent claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 7-8, 12, 14-21, 45-46, 50, 52, 57-66 and 103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2.

Abbott ('466) teaches the basic claimed process of making a composite structure including, wrapping a plurality of mandrels (65, 66, 68) with a dry, fibrous material to form a wrapped mandrel, placing said wrapped mandrel in a mold, injecting a resin into said mold to impregnate said dry, fibrous material and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see col. 10, lines 36-43 and col. 16, lines 28 through

col. 17, line 20). Further, it is noted that Abbott ('466) teaches the use of honeycomb core in a pre-preg arrangement (see col. 20, lines 22-30).

Regarding claims 1-2 and 45, although Abbott ('466) teaches a honeycomb core, Abbott ('466) does not teach a sealed honeycomb sandwich structure having a thermoplastic barrier layer and an adhesive layer. EP 0 786 330 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (1) and external fibrous sheets (4) that are attached to said honeycomb core by adhesive sheets (2) and thermoplastic barrier film (3), placing said sandwich structure in a mold, injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 5 lines 1-10 and Figure 1). Therefore, it would have been obvious for one of ordinary skill in the art to have provided the sandwich structure of EP 0 786 330 A2 in the structure obtained by the process of Abbott ('466) because, Abbott ('466) specifically suggests the use of honeycomb core and also because, EP 0 786 330 A2 teaches that such a structure provides for an improved product. Furthermore, it is noted that both references teach similar end-products and materials and as such require similar functioning characteristics.

Further regarding claims 1-2 and 45, Abbott ('466) in view of EP 0 786 330 A2 do not teach a support layer between said honeycomb core and said adhesive layer. EP 1 005 978 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (2) and external fibrous sheets (4) that are attached to said honeycomb core by opposing adhesive sheets (3), placing said sandwich structure in a mold,

injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 3, paragraph [0012] and page 4, paragraphs [0021]-[0025]). Further, EP 1 005 978 A2 teaches that said opposing adhesive sheets (3) include a layer (3a) that acts as a support layer (see paragraphs [0016]-[0018]). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a support layer as taught by EP 1 005 978 A2 in the composite structure obtained by the process of Abbott ('466) in view of EP 0 786 330 A2 because, EP 1 005 978 A2 teaches that such a support layer provides for an improved product by controlling the flow of resin into the honeycomb cells, hence providing for an improved product.

In regard to claims 3 and 46, Abbott ('466) teaches a stack of material that does not include a core and a material stack that includes a core, hence Abbott ('466) teaches a material stack having a core or not having a core, depending on the desired structure.

Specifically regarding claims 7-8 and 52, Abbott ('466) teaches a multi-directional fibered material (see col. 10, lines 8-12). It is submitted that multi-directional fibrous sheets includes a specified direction of the fibers.

Specifically regarding claim 12, Abbott ('466) teaches an external mold tool (60) and internal mandrel tools (65, 66, 68) (see col. 10, lines 14-35).

In regard to claim 50, EP 0 786 330 A2 teaches a process of making a composite structure including, providing a sandwich structure having an internal honeycomb core (1) and opposing external fibrous sheets (4) that are attached to said honeycomb core by opposing adhesive sheets (2) and an opposing thermoplastic barrier film (3), placing said sandwich

structure in a mold, injecting a resin into said mold to impregnate said external fibrous sheets (4) and curing said resin under conditions of heat, pressure and vacuum to form said composite structure (see page 5 lines 1-10 and Figure 1). Therefore, it would have been obvious for one of ordinary skill in the art to have provided the sandwich structure of EP 0 786 330 A2 in the structure obtained by the process of Abbott ('466) in view of EP 1 005 978 A2 because, Abbott ('466) specifically suggests the use of honeycomb core and also because, EP 0 786 330 A2 teaches that such a structure provides for an improved product. Furthermore, it is noted that all references teach similar end-products and materials and as such require similar functioning characteristics.

Regarding claims 14 and 57-58, Abbott ('466) teaches a non-stick layer between the mandrel and the fibrous reinforcement (see col. 10, lines 35-43). Further regarding claim 58, Abbott ('466) teaches placing the wrapped mandrels in the external mold tool (60) (see col. 10, lines 14-35).

Specifically regarding claims 59-60, EP 0 786 330 A2 teaches curing of the adhesive at or above the resin curing temperature (see page 4, line 24). Therefore, it would have been obvious for one of ordinary skill in the art to have cured adhesive at or above the resin curing temperature as taught by EP 0 786 330 A2 in the structure obtained by the process of Abbott ('466) in view of EP 1 005 978 A2 because, Abbott ('466) specifically suggests the use of honeycomb core and also because, EP 0 786 330 A2 teaches that such a structure provides for an improved product. Furthermore, it is noted that all references teach similar end-products and materials and as such require similar functioning characteristics.

Regarding claim 61, EP 0 786 330 A2 teaches curing of the adhesive at a temperature of 25-800 °F (see page 3, line 22). Further, EP 1 005 978 A2 teaches an epoxy RTM resin curing temperature of 356 °F (180 °C) (see page 4, paragraph [0025]). Hence, it is submitted that Abbott ('466) in view of EP 1 005 978 A2 and in further view of EP 1 005 978 A2 teaches combinations of materials in which the adhesive cures at a temperature below the resin curing temperature.

In regard to claims 15-17 and 62-63, Abbott ('466) teaches curing under conditions of heat, pressure and vacuum to form said composite structure (see col. 10, lines 36-43 and col. 16, lines 28 through col. 17, line 20).

Specifically regarding claims 18-21 and 64-66, Abbott ('466) teaches that said composite structure is an aircraft wing structure (full span and semi-span) (see col. 2, lines 50-65). It is submitted that an aircraft wing must allow laminar flow of air over its surface in order to function as an aircraft wing.

Regarding claim 103, Abbott ('466) teaches applying a vacuum in the mold cavity, hence all components inside the mold create a vacuum path in order for the air to be evacuated. As such the support layer also participates in creating said vacuum path.

7. Claims 9-10, 13, 53-55 and 101-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Lunde (US Patent No. 6,692,681 B1).

Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 teach the basic claimed process as described above.

Regarding claims 9-10, 13 and 53-55, Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 do not teach reducing the modification of fiber orientation during resin injection by using an internal elastomeric tool. Lunde ('681) teaches a process for molding a composite part including, providing a bladder-covered mandrel (elastomeric tool), wrapping said bladder-covered mandrel with a fiber reinforcement layer to form a wrapped mandrel, placing said wrapped mandrel in a mold, compressing said fiber reinforcement layer against the inner wall of said mold by applying an internal pressure (altering the shape and internal pressure of the inner mold) to said bladder and curing said fiber reinforcement layer under conditions of heat, pressure and vacuum to form a composite part (see Abstract). Further, Lunde ('681) teaches that said fiber reinforcement layer includes a sandwich structure having a honeycomb core and fibrous sheets (see col. 7, lines 43-54). Furthermore, Lunde ('681) teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur (see col. 17, line 36 through col. 18, line 6). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a bladder-covered mandrel as taught by Lunde ('681) in the process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 because, Lunde ('681) specifically teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur, hence providing for an improved product and also because all references teach similar materials and end-products.

Regarding claims 101-102, Abbott ('466) teaches metallic molds and polymeric resin. Lunde ('681) teaches a polyolefin or nylon (thermoplastic) bladder. It is submitted that a metallic mold has a different coefficient of contraction than a thermoplastic material. As such, during cooling, it is submitted that the mold in the process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Lunde ('681) will contract more, hence altering its shape and aligning itself with the inflated bladder.

8. Claims 9 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Jones *et al.* (US Patent No. 5,023,041).

Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 teach the basic claimed process as described above.

Regarding claims 9 and 53, Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 do not teach reducing the modification of fiber orientation during resin injection. Jones *et al.* ('041) teach a resin transfer molding process in which the temperature and pressure are carefully controlled in order to control the viscosity and flow of the resin matrix, hence controlling unwanted motion of the reinforcing fibers (see col. 1, lines 25-35). Therefore, it would have been obvious for one of ordinary skill in the art to have carefully controlled the temperature and pressure as taught by Jones *et al.* ('041) in the resin transfer molding process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 because, Jones *et al.* ('041) specifically teach that temperature and pressure control results in controlling

unwanted motion of the reinforcing fibers, hence providing for an improved product and also because all references teach similar end-products and processes.

9. Claims 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (US Patent No. 6,638,466 B1) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2, Jones *et al.* (US Patent No. 5,023,041) and Lunde (US Patent No. 6,692,681 B1).

Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Jones *et al.* ('041) teach the basic claimed process as described above.

Regarding claims 54-55, Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Jones *et al.* ('041) do not teach an internal elastomeric tool. Lunde ('681) teaches a process for molding a composite part including, providing a bladder-covered mandrel (elastomeric tool), wrapping said bladder-covered mandrel with a fiber reinforcement layer to form a wrapped mandrel, placing said wrapped mandrel in a mold, compressing said fiber reinforcement layer against the inner wall of said mold by applying an internal pressure (altering the shape and internal pressure of the inner mold) to said bladder and curing said fiber reinforcement layer under conditions of heat, pressure and vacuum to form a composite part (see Abstract). Further, Lunde ('681) teaches that said fiber reinforcement layer includes a sandwich structure having a honeycomb core and fibrous sheets (see col. 7, lines 43-54). Furthermore, Lunde ('681) teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur (see col. 17, line 36 through col. 18, line 6). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a bladder-covered

mandrel as taught by Lunde ('681) in the process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Jones *et al.* ('041) because, Lunde ('681) specifically teaches that the expansion of the bladder and the orientation of the fiber reinforcement material allows for wanted motion to occur between the fibers such that stretching and residual stresses do not occur, hence providing for an improved product and also because all references teach similar materials and end-products.

Regarding claim 56, Jones *et al.* ('041) teach a resin transfer molding process in which the temperature and internal pressure are carefully controlled in order to control the viscosity and flow of the resin matrix, hence controlling resin flow rate (see col. 1, lines 25-55). Therefore, it would have been obvious for one of ordinary skill in the art to have carefully controlled the temperature and internal pressure as taught by Jones *et al.* ('041) in the resin transfer molding process of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Lunde ('681) because, Jones *et al.* ('041) specifically teach that temperature and pressure control results in controlling the resin flow rate, which in turn controls unwanted motion of the reinforcing fibers, hence providing for an improved product and also because all references teach similar end-products and processes.

Response to Arguments

10. Applicants' remarks filed January 4, 2005 have been considered.

Applicants argue throughout the remarks filed 1/4/2005 that the art of record does not teach or suggest "applying a support layer between the core section and the adhesive layer" (see

pages 27-31 of the amendment filed 1/4/2005). In response it is noted that EP 1 005 978 A2 specifically teaches that said opposing adhesive sheets (3) include a layer (3a) that acts as a support layer because it is different than the adhesive layer and as such has a supporting function for the adhesive layer (see paragraphs [0016]-[0018]). Further, under MPEP §2144.04 (V)(C), it is noted that making separable that which the prior art teaches as being integral is an obvious matter. *See, In re Dullberg*, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961).

Applicants argue that secondary references Lunde ('681) and Jones *et al.* ('041) do not teach "the application of a support layer" (see pages 29-30 of the amendment filed 1/4/2005). In response, it is noted that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *See In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, it is the combination of Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Jones *et al.* ('041) or Abbott ('466) in view of EP 0 786 330 A2 and in further view of EP 1 005 978 A2 and Lunde ('681) that form the rejection. Furthermore, it is noted that EP 1 005 978 A2 specifically teaches that said opposing adhesive sheets (3) include a layer (3a) that acts as a support layer because it is different than the adhesive layer and as such has a supporting function for the adhesive layer (see paragraphs [0016]-[0018]).

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

A handwritten signature in black ink, appearing to read 'Stefan Staicovici', written in a cursive style.

Primary Examiner

3/21/05

AU 1732

March 21, 2005